AMENDMENTS TO THE SPECIFICATION

Please replace Paragraph **[0019]** **[0035]** and **[0050]** with the following paragraphs rewritten in amendment format:

[0018] Figure 6 is a block diagram of components of the calibration station and as operable with the tool monitor-controller; ~~**[0019]** Figure 7 is a block diagram of components of the work cell supervisor as operable with the tool monitor-controller in the work cell in which it is located; and also shows it communicable with the factory wide supervisor and a work cell transfer line;~~

[0019] Figure 7 is a block diagram of components of the work cell supervisor as operable with the tool monitor-controller in the work cell in which it is located; and also shows it communicable with the factory wide supervisor and a work cell transfer line;

[0035] The following is an exemplary list of parameters:

1. Tool Type – This is typically defined as a coded type plus manufacturer code. Tool Type could be one for Fastening, various Dimensional checking, Pressure checking, Force measurement and the like. A specific example of this code would be FB for Fastening, Bosch, a tool made by Bosch Tool Corporation, for fastening threaded fasteners. This is set by the preliminary set up station 18 at the facility where the electronics are installed and is not field changeable.

2. Tool Model Number - This is entered to reflect the tool manufacturer's model number in the format routinely displayed on the outer markings of the tool. This is set by the preliminary set up station 18 where the electronics are initially installed or can be changed in the field by selected, certified technicians using password protected features of the calibration station 20 when a change has

been made to the mechanics of the tool that alter its applicability to a particular work cell or alter the fundamental operation of a tool (new gear ratio, addition of special end effectors, etc.)

3. Tool Serial Number – This is entered to reflect the tool manufacturer's serial number routinely displayed in the format seen on the outer markings of the tool. This is set by the preliminary set up station 18 at the facility where the electronics are installed and is not field or end user changeable.

4. Tool Build Date – This is the date that the electronics with R-F link enhancements for providing error proofing were installed in the base tool but is not the date the base tool was manufactured. This is set by the preliminary set up station 18 where the electronics is initially installed and is not field changeable.

5. PCB Serial Number (printed circuit board) – This is the serial number of the printed circuit board used to build the tool monitor-controller 12. This is set by the preliminary set up station 18 at the facility where the electronics is initially installed or can be changed in the field by selected, certified technicians using the password protected features of the calibration station 20 when the module with a tool monitor-controller 12 is replaced.

6. PCB Revision (printed circuit board) – This is the revision date of the printed circuit board used to build the tool monitor-controller 12. This is set by the preliminary set up station 18 at the facility where the electronics was installed or can be changed in the field at the assembly factory by selected certified technicians using the password protected features of the calibration station 20 when a tool monitor-controller 12 is replaced.

7. Tool Monitor -Controller Software Revision – This reflects the revision of the software programmed into the memory 30 of the tool monitor-controller 12. This can be set by the preliminary set up station 18 at the facility where the electronics was installed or changed in the field by selected, certified technicians using the password protected features of the calibration station 20 when the software in the tool monitor-controller 12 is reprogrammed or replaced.

8. Total Tool Cycle Count – As a tool 10 is used and executes "good" cycles the tool monitor-controller 12 reports good cycle information to the work cell supervisor 16. For a torque tool, a "good" cycle is when the desired magnitude of installation torque is attained in setting a fastener. Because in some forms of the invention the amount of programming space is highly limited in the tool monitor-controller 12 and in the memory 30, the software to keep track of the number of cycles a tool 10 has been run is executed in the work cell supervisor 16. Because, in some instances, it is the nature of the tool memory 30 to be limited in the number of times it can be successfully written into, in one case, the total tool cycle count is incremented only after 100 good cycles have been run. After 100 good cycles have been performed, the work cell supervisor 16 writes a new (incremented by 100) total cycle count into the memory 30 on the tool monitor-controller 12. This count is set at zero by the preliminary set up station 18 at the facility where the electronics is initially installed and automatically incremented after each 100 cycles through the normal operation and interaction of the tool monitor-controller 12 and the work cell supervisor 16. This 100 cycle count

cannot be reset at the customer site and can only be changed at the facility where the electronics was installed.

9. Cycle Count At Last Service Interval – This is set initially at zero by the preliminary set up station 18 when the electronics is initially installed and is automatically reset using the calibration station 20 when a tool is serviced and recalibrated by certified technicians. When a tool is serviced, the calibration station 20 will read the total tool cycle count and copy its present value into the cycle count at last service interval automatically. It will also revise the 15. Date of Last Calibration to "today's" date.

10. Service Interval Cycles – This sets the maximum number of cycles allowed to be run on a tool between service intervals. This is initially set at an appropriate number, i.e. for example 100,000 cycles, by the preliminary set up station 18. This can then ~~re~~ be reset by the calibration station 20. A tool is shut down by the work cell supervisor 16 if the total tool cycle count is greater than or equal to the tool's cycle count at last service interval plus the pre-set service interval cycles. In one form of the invention, an alarm output will be generated by the work cell supervisor 16 if the total tool cycle count is greater than or equal to the tool's cycle count at last service interval plus 80% of the pre-set service interval cycles. This creates an alarm at 80% of the service interval to assure plenty of time to re-certify the tool or provide a replacement tool to avoid or minimize assembly line down time. The facility where the electronics is installed will place this default value into this parameter via the preliminary set up station

18, but the service technician can change it at any time through the calibration station software 40 at the calibration station 20.

11. Date Of Last Service – This is automatically entered by the calibration station 20 when a tool is re-calibrated after servicing. It will also revise 9. Cycle Count at Last Service, 13. Cycle Count At Last Calibration, and 15. Date of Last Calibration.

12. Service Interval Days – This sets the maximum number of calendar days a tool is allowed to be run between servicing and is originally set at the preliminary set up station 18 at an appropriate number, for example 100 days. A tool is shut down by the work cell supervisor 16 if the present date is greater than or equal to the tool's date of last service plus the pre-set service interval days. In one form of the invention an alarm output will be generated by the work cell supervisor 16 if the present date is greater than or equal to the tool's date of last service plus 80% of the pre-set service interval days. This creates an alarm at 80% of the pre-set service interval days to assure plenty of time to re-certify the tool or provide a replacement tool to avoid or minimize assembly line down time. The preliminary set up station 18 will initially place this default value into this parameter, but the service technician can change this default number at any time through the calibration station software 40.

13. Cycle Count At Last Calibration – This is set at zero at the facility where the electronics is installed and automatically set when a tool is calibrated by certified technicians using the calibration station 20. When a tool is calibrated, the calibration station 20 will read the total tool cycle count and record its present

value into the cycle count at last calibration automatically. It will also reset 15. Date of Last Calibration.

14. Calibration Interval Cycles – This sets the maximum number of cycles a tool is allowed to be run between calibrations. A tool is shut down by the work cell supervisor 16 if the total tool cycle count is greater than or equal to the tool's cycle count at last calibration plus the pre-set calibration interval cycles. In one form of the invention, an alarm output will be generated by the work cell supervisor 16 if the total tool cycle count is greater than or equal to the cycle count at last calibration plus 80% of the pre-set calibration interval cycles. This creates an alarm at 80% of the allowable cycle counts between calibrations to assure plenty of time to re-certify the tool or provide a replacement tool to avoid or minimize assembly line down time. The facility where the electronics is installed will initially place a default value into this parameter by the preliminary set up station 18, but the service technician can change it at any time through the calibration station software 40.

15. Date Of Last Calibration – This is set at the facility where the electronics is installed by the preliminary set up station 18 to the tool build date and automatically reset at the assembly factory when a tool is calibrated by certified technicians using the calibration station 20.

16. Calibration Interval Days – This sets the maximum number of calendar days a tool is allowed to be run between calibrations. A tool is shut down by the work cell supervisor 16, which determines the elapsed days, if the present date is greater than or equal to the tool's date of last calibration plus the pre-set

calibration interval days. In one form of the invention an alarm output will be generated by the work cell supervisor 16 if the present date is greater than or equal to the tool's date of last calibration plus 80% of the pre-set calibration interval days. This creates an alarm at 80% of the pre-set calibration interval days to assure plenty of time to re-certify the tool or provide a replacement tool to avoid or minimize assembly line down time. The facility where the electronics is installed will initially place a default value into this parameter, but the service technician can change it at any time through the calibration station software 40.

17. Customer Field 1 – This memory location is open for customer use. These data fields are set at the facility where the electronics is installed to null characters by the preliminary set up station 18, but the customer can insert information or change them at the assembly factory by using the calibration station 20.

18. Customer Field 2 - see Customer Field 1.

19. Customer Field 3 - see Customer Field 1.

20. Tool Maximum Capacity (torque, dimension, pressure, force, etc) in engineering units. This is set at facility where the electronics is installed by the preliminary set up station 18 or changed in the field at the assembly factory by certified technicians using the password protected features of the calibration station 20 when a change has been made to the mechanics of the tool that alter its applicability to a particular work cell 14 or alter the fundamental operation of a tool (new gear ratio, addition of special end effectors, etc.).

21. Engineering Units (Lb-Ft, Inches, PSI, Lbs, Etc.) This is set at the facility where the electronics is installed by the preliminary set up station 18 or changed in the field at the assembly factory by certified technicians using the calibration station 20 and the calibration station software 40.

22. Tool Minimum (Torque, Dimension, Pressure, Force, Etc.) This is set the facility where the electronics is installed by the preliminary set up station 18 or changed in the field at the assembly factory by certified technicians using the password protected features of the calibration station 20 when a change has been made to the mechanics of the tool that alter its applicability to a particular work cell or alter the fundamental operation of a tool (new gear ratio, addition of special end effectors, etc.).

23. Spare – This is an open information site in the tool memory 30 accessible by the calibration station 20 at the assembly factory to put in whatever information the end user desires monitoring, such as other rebuild dates, etc.; it should be understood that a number of other open memory locations could be provided for selected use by the end user.

24. Tool Setting (torque, dimension, pressure, force, etc). This is generated by the calibration station 20 and is typically the calculated average of 10 cycles. This is set at the facility where the electronics is installed by the preliminary set up station 18 or changed in the field at the assembly factory by technicians using the calibration station 20 when an adjustment has been made to the average capability of the tool (e.g. adjustment to the torque clutch, etc.). The service technician can change it at any time through the calibration station software 40.

[0050] A special enhanced version of the calibration station 20 can be used for major tool repair or reconfiguration. The enhanced version of software can be called "the tool repair station" just for differentiation purposes for this disclosure. Such a tool repair station can have all of the capabilities of the calibration station 20, but through the use of passwords and privileged access to supplemental software that will be included in the calibration station software 40 will allow the certified service technician to gain access to altering some of the parameters stored in the tool memory 30 of the tool 10. The tool repair station can facilitate repairs or reconfigurations done at the user's site at the assembly factory or an outside source other than the tool factory by specified trained technicians. Only through entering the proper pass codes will such a selected repair technician be able to gain access to all of the parameters that need to be changed when modifications are made to the tool that affect its capabilities, e.g. change to a gear ratio, addition of a gear stage that would effect direction of rotation, a revised set of software programmed into the tool 10, etc. The calibration station 20 will be linked to the factory wide supervisor 23 to provide the data necessary to keep a current and central file on all tools located within the assembly factory. If the assembly factory personnel want to start repairing these tools, then routinely this will be done by a trained or certified repair technician capable of repairing these tools. The following chart identifies those tool parameters that can be changed by the calibration station 20, and those parameters accessible solely through password enabling as would be used after a tool repair. ~~in~~In the chart an "N" indicates that the parameter can be changed

without entering a password, a "Y" indicates that the parameter can be changed at the calibration station only if the proper password has been entered (as would be done after a tool repair).

Parameters Alterable by the Calibration Station & by the Password Enabled Calibration Station
N=No, Y=Yes

Item	Parameter Name	Calibration Station	Tool Repair
2	Tool Model Number	N	Y
5	PCB Serial Number (printed circuit board)	N	Y
6	PCB Revision (printed circuit board)	N	Y
7	Tool Monitor-Controller 12 Software revision	N	Y
9	Cycle Count At Last Service Interval	Y	Y
10	Service Interval Cycles	Y	Y
11	Date Of Last Service	Y	Y
12	Service Interval Days	Y	Y
13	Cycle Count At Last Calibration	Y	Y
14	Calibration Interval Cycles	Y	Y
15	Date Of Last Calibration	Y	Y
16	Calibration Interval Days	Y	Y
17	Customer Field 1	Y	Y
18	Customer Field 2	Y	Y
19	Customer Field 3	Y	Y
20	Tool Max. Capacity (torque, dimension, pressure, force, etc.	N	Y
21	Engineering Units (Lb-Ft, inches, PSI, Lbs, etc.)	Y	Y

Item	Parameter Name	Calibration Station	Tool Repair
22	Tool Minimum Capacity (torque, dimension, pressure, force, etc).	N	Y
23	Spare	Y	Y
24	Tool Setting (torque, dimension, pressure, force, etc).	Y	Y

Note: Parameters 1, 3, 4 & 8 are not listed because they are non-field-changeable.